Instruction Manual

Simpson

Auto Ranger®

Generator Regulator Tester

Model GRT

PRICE: $1.00

SIMPSON AUTOMOTIVE SALES
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D.C. CHARGING SYSTEMS

Autolite, Delco-Remy, Ford, Lucas and Prestolite Standard Duty, 6 and 12 Volt, Negative and Positive Ground Systems with Single or Double Contact Three Unit Regulators.

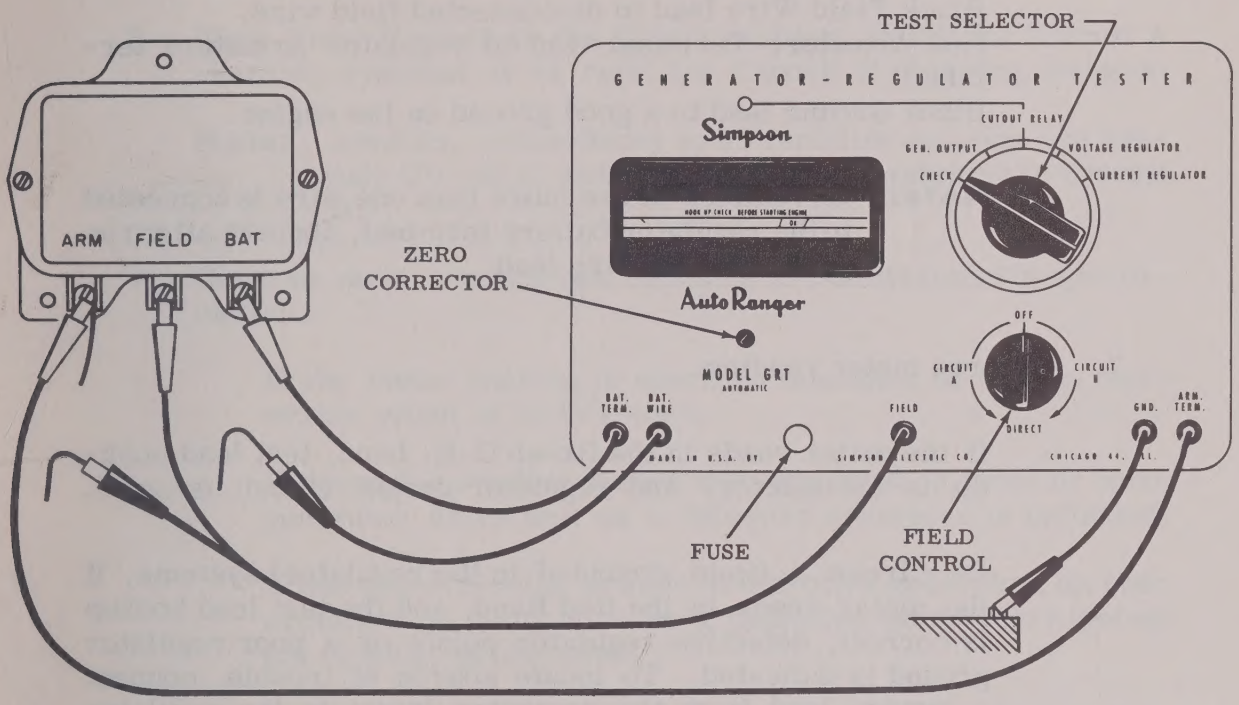

Figure 1

TEST PROCEDURE

PREPARATION FOR TESTS

1. Set parking brake and place transmission shift lever in neutral or park position.

2. Turn headlights on low beam.

3. Start engine and operate at fast idle with hood closed until charging system reaches normal operating temperature. Stop engine and turn headlights off.

4. Disconnect battery and field wires from regulator Battery and Field terminals. Remove screw from regulator Battery terminal.

5. Turn Test Selector switch to the Check position.

6. Observe markings on test leads and tester panel and connect test leads to vehicle. See figure 1.

Red Battery Terminal lead to regulator Battery terminal.
Black Battery Wire lead to disconnected battery wire.
Red Field Terminal lead to regulator Field terminal.
Black Field Wire lead to disconnected field wire.
Red Armature Terminal lead to regulator Armature terminal.
Black Ground lead to a good ground on the engine.

Note: On vehicles where more than one wire is connected to the regulator battery terminal, connect all wires to the battery wire lead.

7. Observe meter reading.

If the meter reads in the Green O.K. band, test lead hookup is satisfactory and regulator ground circuit is good.

On Circuit A (field grounded in the regulator) systems, if the meter reads in the Red Band, and the test lead hookup is correct, defective regulator points or a poor regulator ground is indicated. To locate source of trouble, connect a jumper lead from the generator frame to the regulator base. If the meter now reads in the Green O.K. band, the regulator ground connection is defective. If the meter continues to read in the Red band, the regulator points are defective.

On Circuit B (field grounded in the generator) systems, if the meter reads in the Red Band and the test lead hookup is correct, defective regulator points, poor generator brush contact or excessive resistance in generator armature circuit is indicated. To locate source of trouble, connect a jumper lead from the generator frame to the generator Armature terminal. If the meter now reads in the Green O.K. Band, a defective generator is indicated.

If the meter reading remains in the Red Band, move the jumper lead from the generator Armature terminal to the regulator Armature terminal. If the meter now reads in the Green O.K. Band, the armature wire from the generator to the regulator is defective. If the meter continues to read in the Red Band, the regulator points are defective.

GENERATOR OUTPUT TEST

1. Turn Test Selector switch to the Generator Output position.

2. Start engine and operate at 1500 rpm or speed specified for generator output test.

3. Turn Field Control to the Direct position, to left for Circuit A charging systems or to right for Circuit B charging systems.

   Note: Autolite, Delco-Remy and Prestolite systems are usually Circuit A; and Ford and Lucas systems are Circuit B.

4. Observe meter reading and compare to manufacturer's specifications.

   If the meter reading is specified minimum or higher, generator output is satisfactory.

   If the meter reading is less than specified, a loose or worn generator drive belt or a defective generator is indicated.

   If the meter reading is zero, a defective generator, an open armature or field wire or a defective cutout relay (points not closing) is indicated.

   Note: Generator Output must be satisfactory before performing regulator tests.

CUTOUT RELAY TEST

1. Turn Test Selector switch to the Cutout Relay position.

2. Adjust engine speed to 1500 rpm.

3. Slowly turn Field Control toward the Direct position (either direction) while observing both the meter and the indicator lamp.

4. Note the meter reading at the instant the indicator lamp lights. This is the closing voltage of the cutout relay and should be within the manufacturer's specifications. Unless otherwise specified, the meter should read in the Green Band.

   Note: If difficulty is experienced performing this test at 1500 rpm, reduce the engine speed to 800 - 1000 rpm.

If the meter reading is within voltage range specified, cut-out relay closing voltage is satisfactory.

If the meter reading is higher or lower than specified, cut-out relay closing voltage requires adjustment. See manufacturer's Service Manual for adjustment procedure.

If the indicator lamp fails to light, a defective cutout relay or an improperly adjusted voltage regulator and/or cutout relay is indicated.

Note: If voltage regulator setting is lower than voltage required to close cutout relay, cutout relay points will not close. There should always be a minimum of .5 volt difference between the closing voltage of the relay and the voltage regulator setting; the regulator setting being the higher.

VOLTAGE REGULATOR TEST

1. Turn Test Selector switch to the Voltage Regulator position.

2. Adjust engine speed to 1500 rpm or speed specified for voltage regulator test.

3. Turn Field Control to the Direct position (either direction) and hold until regulated voltage stabilizes.

   Note: If battery is in a low state of charge, it may require a few minutes of continuous operation for a normal operating voltage regulator to reach its actual setting.

4. Observe meter reading and compare to manufacturer's specifications. Unless otherwise specified, the meter should read in the Green Band.

   If the meter reading is steady and within specifications, regulator setting is satisfactory.

   If the meter reading is steady but reads higher or lower than specified, regulator requires adjustment or replacement. See manufacturer's Service Manual for adjustment procedure.

   If the meter reading is unsteady or erratic, or will not respond to adjustment, regulator is defective.

   Note: To "cycle" the regulator between adjustments, turn the Field Control to the Off position and then back to the Direct position.

CURRENT REGULATOR TEST

1. Turn Test Selector switch to the Current Regulator position.
2. Adjust engine speed to 1500 rpm.
3. Turn Field Control to the Direct position (either direction).
4. Observe meter reading and compare to specifications. See Voltage Regulator Test for test indications.

Caution: Do not hold Field Control in the Direct position any longer than is necessary to obtain meter reading. Due to the excessive heat given off by the loading device, prolonged testing may damage the tester.

When adjusting the current regulator, check the setting after each adjustment. Do not hold the Field Control in the Direct position while adjusting.

A.C. CHARGING SYSTEMS

Chrysler, Delcotron, Ford, Motorola and Prestolite Standard Duty, 12 Volt, Negative Ground Systems With One or Two Unit Vibrating Contact or Transistor Voltage Regulator.

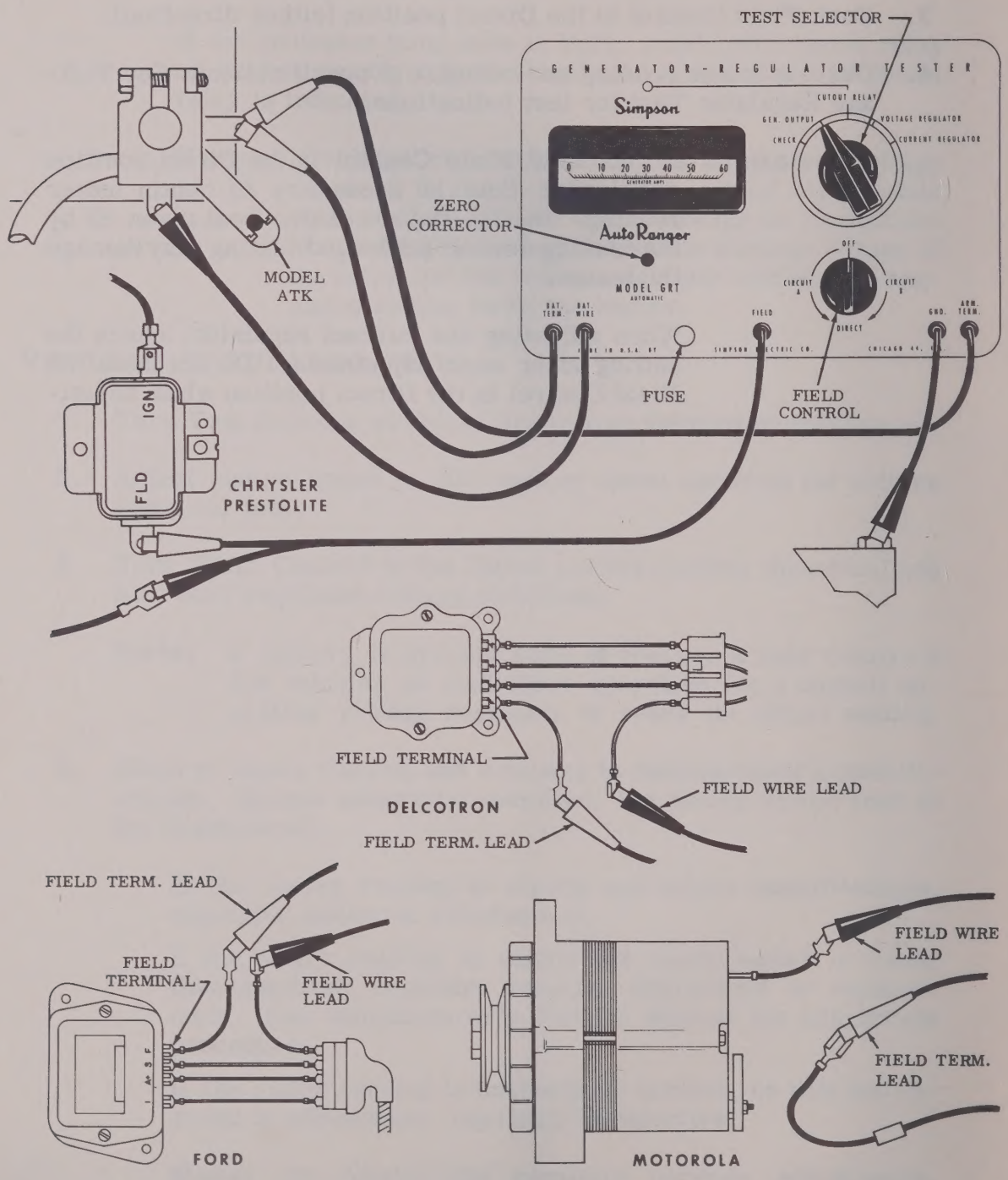

Figure 2

TEST PROCEDURE

PREPARATION FOR TESTS

1. Set parking brake and place transmission shift lever in neutral or park position.

2. Turn headlights on low beam.

3. Start engine and operate at fast idle with hood closed until charging system reaches normal operating temperature. Stop engine and turn lights off.

4. Disconnect battery cable from battery positive (+) post and connect Battery Post Adapter to battery post. Connect battery cable to adapter and set switch to open position (toggle down). See figure 2.

5. Disconnect field wire from regulator Field terminal. On Delcotron and Ford, disconnect wiring harness from regulator. On Motorola, disconnect field wire from alternator Field terminal.

6. Connect jumper leads as follows:

   On Delcotron and Ford, connect one jumper lead to each regulator terminal. Connect all leads except the one connected to the regulator "F" terminal to the corresponding terminal in the wiring harness. Connect another jumper lead to the "F" terminal in the wiring harness. See figure 2.

   Note: On some applications, only two or three of the four regulator terminals shown are used.

   Caution: On systems equipped with a transistor regulator, do not connect the regulator to the wiring harness until after the Output Test has been completed.

   On Motorola, connect one jumper lead to the alternator Field terminal and another to the disconnected field wire. See figure 2.

7. Turn Test Selector switch to the Generator Output position.

8. Observe markings on test leads and tester panel and connect test leads to vehicle. See figure 2.

   Red Battery Terminal lead to terminal on Battery Post Adapter marked Battery Terminal.
   Black Battery Wire lead to terminal on Battery Post Adapter marked Battery Wire.
   Red Armature Terminal lead to terminal on Battery Post Adapter marked Battery Terminal.
   Red Field Terminal lead to regulator (F) terminal or to disconnected field wire if connected at alternator.
   Black Field Wire lead to disconnected field wire or to alternator Field terminal if connected at alternator.
   Black Ground lead to a good ground on the engine.

   Caution: Do not allow loose ends of jumper leads to touch ground.

ALTERNATOR OUTPUT TEST

Warning: On systems equipped with a transistor regulator, disconnect regulator from charging system before making Output Test.

1. Close Battery Post Adapter switch (toggle up) and start engine.

2. Open Battery Post Adapter switch (toggle down) and adjust engine speed to that specified for alternator output test. Unless otherwise specified, adjust engine speed as follows:

Chrysler.	1250 rpm
Delcotron.	2500 rpm
Ford.	2500 rpm
Motorola.	2000 rpm
Prestolite.	1750 rpm

Note: Meter reading to left of zero with field control in Off position is the battery discharge current used by the ignition system.

3. Turn Field Control to the Direct position, Circuit B.

4. Observe meter reading and compare to manufacturer's specifications.

Note: Add 5 amperes to the meter reading for output test. This is the approximate current used by the ignition system and alternator field coil combined and does not reach the tester to be measured.

If meter reading is specified minimum or higher, alternator output is satisfactory.

If meter reading is less than specified, a loose or worn alternator drive belt or a defective alternator is indicated.

If meter reading does not change from that obtained when the Field Control is in the Off position, a defective alternator or an open field wire is indicated. Perform Field Current Draw Test to determine condition of alternator field circuit. See page 9.

VOLTAGE REGULATOR TEST

1. Turn Test Selector switch to the Voltage Regulator position.

Note: Change switch position quickly, otherwise engine will stall.

2. Adjust engine speed to that specified for voltage regulator test. Unless otherwise specified, adjust engine speed as follows:

Chrysler.	2200 rpm
Delcotron.	2500 rpm
Ford.	2000 rpm
Motorola.	1500 rpm
Prestolite.	1500 rpm

3. Turn Field Control to the Direct position (either direction), and hold until regulated voltage stabilizes.

Note: If battery is in a low state of charge, it may require a few minutes of continuous operation for a normal operating regulator to reach its actual setting.

4. Observe meter reading and compare to manufacturer's specifications.

   If the meter reading is steady and within specifications, regulator setting is satisfactory.

   If the meter reading is steady but reads higher or lower than specified, regulator requires adjustment or replacement. See manufacturer's Service Manual for adjustment procedure.

   If the meter reading is unsteady or erratic or will not respond to adjustment, regulator is defective.

   If the meter reading does not change from that obtained when the Field Control is in the Off position, regulator is defective, field relay (if used) is not closing, or wire from alternator Neutral or Stator terminal to field relay is open.

   Note: To "cycle" the regulator between adjustments, turn the Field Control to the Off position and then back to the Direct position.

FIELD CURRENT DRAW TEST

1. Stop engine and turn ignition switch off.
2. Turn Test Selector switch to the Generator Output position.
3. Disconnect Ground lead from engine.
4. Turn Field Control to the Direct position, Circuit B.
5. Observe meter reading and compare to specifications for Field Current Draw.

   If meter reading is approximately within specifications, Field Current Draw is satisfactory.

   If meter reads zero, alternator field circuit is open.

   If meter reading is higher or lower than specified, alternator field circuit is defective.

   Note: Ignition, headlight and accessory current draw may also be measured in this manner. Turn on component to be checked, but do not operate Field Control. Meter reading is the current draw for the component or series of components turned on at that time.

Simpson SERVICE ACROSS THE NATION

● **Simpson Authorized Repair Stations are located in all principle cities in the United States, including Hawaii, and are equipped to give you fast, efficient service.**

Should your Simpson Auto Ranger test equipment require service, contact your jobber or send it to the authorized repair station nearest you.

ONE YEAR WARRANTY

SIMPSON AUTOMOTIVE SALES warrants each instrument and other articles of equipment manufactured by it to be free from defects in material and workmanship for one year after delivery to original purchaser; its obligation under this warranty being limited to making good at its factory or authorized repair stations any instrument or other article of equipment which is returned intact to it, with transportation charges prepaid, and which its examination shall disclose to its satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on its part, and SIMPSON AUTOMOTIVE SALES neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale of its products.

This warranty shall not apply to any instrument or article of equipment which has been repaired or altered outside the SIMPSON AUTOMOTIVE SALES factory or authorized repair stations, or which has been subject to abuse, negligence, accident, incorrect wiring by others, or use not in accordance with instructions furnished by the manufacturer.

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